DOCUMENT RESUME

ED 169 380 CE 020 565

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TITLE	Data Processing--Flowcharting. Kit No. 91. Instructor's Manual [and] Student Learning Activity Guide.
INSTITUTION	Clemson Univ., S.C. Vocational Education Media Center.; South Carolina State Dept. of Education, Columbia. Office of Vocational Education.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	78
GRANT	SC-5058-76-I-211-0330
NOTE	26p.; For related documents see CE 020 474-566
AVAILABLE FROM	Vocational Education Media Center, 10 Tillman Hall, Clemson University, Clemson, South Carolina 29631 (complete set of modules, 14 filmstrips and cassettes, $260.00; set of 87 student modules, $42.50)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Behavioral Objectives; *Data Processing; *Flow Charts; Instructional Materials; *Learning Activities; *Learning Modules; *Occupational Information; *Office Occupations Education; Prevocational Education

ABSTRACT

An instructor's manual and student activity guide on computer flowcharting are provided in this set of prevocational education material which focuses on the vocational area of office occupations. (This set of materials is one of ninety-two prevocational education sets arranged around a cluster of seven vocational offerings: agriculture, home economics, distributive education, health occupations, world of work, trade and industry, and office occupations.) The instructor's guide is organized into the following elements: title of activity, duration of activity (three to five periods), activity goals, five instructional objectives, and activity implementation (description, safety precautions, materials needed, teacher preparation prior to class, during the class, follow-up activities, answer key to student check point activities, and masters for duplication). The student activity guide provides step-by-step instructions (narrative and illustrations) for completing each instructional objective. At the end of each set of instructions is a student check point (evaluation activity). Occupational information for a computer-peripheral-equipment operator concludes the document. (JH)

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ED169380

DATA PROCESSING - FLOWCHARTING

Kit No. 91

INSTRUCTOR'S MANUAL

Prepared by

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Westside High School
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State Department of Education
Office of Vocational Education
Prevocational Education
Columbia, South Carolina 29201

In Cooperation With

Vocational Education Media Center
Clemson University
Clemson, South Carolina 29631

1978

CE 020 565

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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TITLE OF ACTIVITY

Kit No. 91, Data Processing Flowcharting

DURATION

Main Activity: 2 periods
Follow-up Activity: 1 – 3 periods

GOALS

The student will learn the step-by-step planning of a program.

The student will understand proper flowcharting procedure.

The student will understand how a computer selects data by eliminating data that will not fit the specifications.

INSTRUCTIONAL OBJECTIVES

The student will identify eight flowchart symbols.

The student will decide which symbol to use for each step in a flowchart.

The student will draw a flowchart with a decision block.

The student will design a flowchart using the personal data sheets to obtain certain information.

The student will differentiate between information in the same manner as a computer.

VOCATIONAL CLUSTERS

None

ACTIVITY IMPLEMENTATION

A. Description

This activity is a simplified explanation of flowcharting. Flowcharting illustrates the steps and sequences of a process. In this activity each student will determine manually the number of students who are 14 and have birthdays in April. The entire process is flowcharted by each student. The students use mimeographed letters to direct their activity.

B. Safety

No specific safety rules.

C. Materials

1. Audio Visual Equipment:

   None

2. Technical Equipment:

   25 Flowcharting templates

3. Expendable Supplies:

   Paper
   Pencils

D. Preparation Prior to Class

Prior to class you will need to duplicate copies from the masters.

You will need one stack of personal data sheets for each student. This can be done by duplicating the two masters containing this information and then cutting the copies.

It would also be helpful to work through the activity to acquaint yourself with it.

E. During Class Sessions

Introduction

This activity will teach you how to flowchart a process whereby the computer determines the correct possibilities for a certain situation by discarding data that will not fit the solution.

Observe the students during the activity and assist when necessary.

F. Follow-up Activities

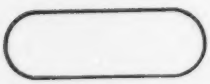
1. VIEW Fact Sheets
2. Letters two and three can be flowcharted and/or sorted depending on time. These should be for students who fully understand the basic flowcharting principles.
3. Have a computer programmer come to the class for a question/answer session or mini demonstration.
4. Have the students program any activity they perform on a regular basis, like getting up in the morning, or opening a locker, or going through the lunch line.

ANSWER KEY

CHECKPOINT: OBJECTIVE 1

1.

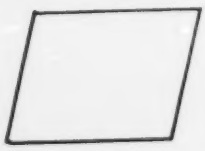
2.

3. 

4.

5.

6.

7. 

8.

9.

LETTER NO. 1

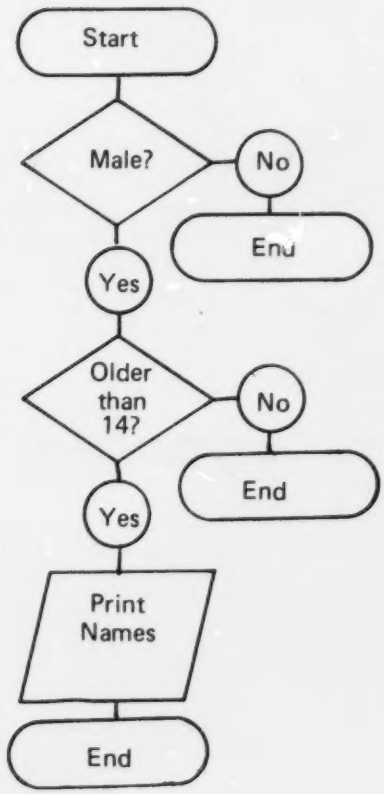
CHECKPOINT: OBJECTIVE V

Brenda Myers
Harold Ambrith
Karen Newbold

FOLLOW–UP – OPTIONAL

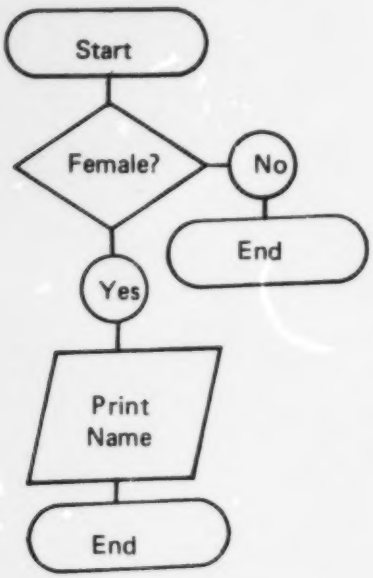
LETTER NO. 2

Flowchart: Paragraph 1



Names: Frank Gibbs
Sam Durk

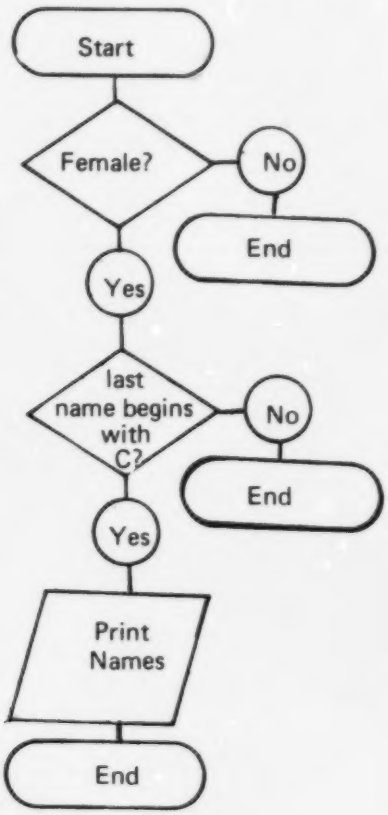
LETTER 2, Continued
FLOWCHART: PARAGRAPH 2



Names: Carolyn Butler
Debbie Dressler
Brenda Myers
Patricia Wilson
Linda Braun
Kim Kobin
Lydia Corbett
Norma Whitney
Karen Newbold
Elise Cavit

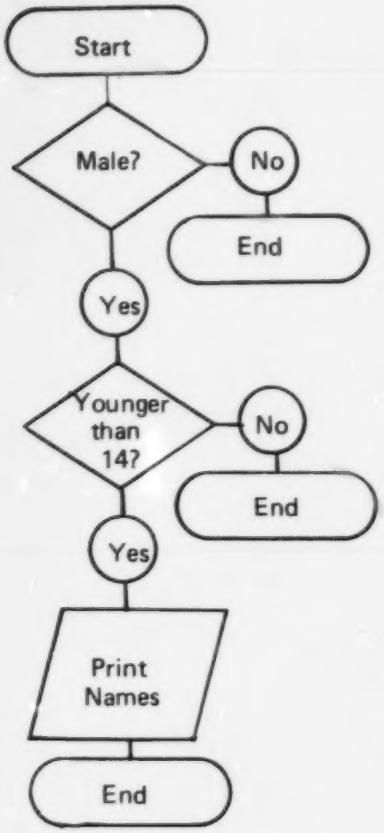
LETTER NO. 3

FLOWCHART: PARAGRAPH 1



Names: Lydia Corbett
Elise Cavit

LETTER 3, Continued
FLOWCHART: PARAGRAPH 2



Names: Ken Lake
Peter Gomez
Tom Olivo
Carroll Whitman

MASTERS FOR DUPLICATION

VIEW Fact Sheet
Checkpoint: Objective I – Identifying Flowchart Symbols
Personal Data Sheets (2)
Letter No. 1
Letter No. 2
Letter No. 3

VIEW FACT SHEET

NAME _____ CLASS _____ OCCUPATION _____

A. List the advantages (good points) of this occupation (job).

B. List the disadvantages (bad points) of this occupation (job).

C. List three things you should know to do this occupation (job).
1.
2.
3.

D. What type of education should you get to be prepared (do) for this occupation (job)?

E. What courses must you take to go into this occupation (job)?

F. What do you think your future in this occupation (job) will be?

G. What wage can you expect in this occupation (job)?

H. What are the working hours of this occupation (job)?

I. To learn more about this occupation (job), write to:

J. Using a scale of 1 to 5, circle the number that measures your interest in this occupation (job) as a possible career.

I don't like it. 1 2 3 4 5 I like it.

CHECKPOINT: OBJECTIVE I

IDENTIFYING FLOWCHART SYMBOLS

COMMAND	SYMBOL
1. File	1.
2. Punched card	
3. Start	2.
4. Decision	
5. Manual preparation	
6. End	3.
7. Input/Output	
8. Connector	4.
9. Process	
	5.
	6.
	7.
	8.
	9.

PERSONAL DATA SHEET

Name: Carolyn Butler Age: 14 Sex: F Month of Birth: December	Name: Brenda Myers Age: 14 Sex: F Month of Birth: April
Name: Frank Gibbs Age: 15 Sex: M Month of Birth: September	Name: Sam Durk Age: 15 Sex: M Month of Birth: May
Name: Debbie Dressler Age: 14 Sex: F Month of Birth: June	Name: Peter Gomez Age: 13 Sex: M Month of Birth: April
Name: Tom Caldwell Age: 14 Sex: M Month of Birth: November	Name: Patricia Wilson Age: 13 Sex: F Month of Birth: August
Name: Ken Lake Age: 13 Sex: M Month of Birth: July	Name: Booker T. Burris Age: 14 Sex: M Month of Birth: January

PERSONAL DATA SHEET

Name: Harold Ambrith **Age:** 14 **Sex:** M **Month of Birth:** April	**Name:** Norma Whitney **Age:** 14 **Sex:** F **Month of Birth:** September
Name: Linda Braun **Age:** 15 **Sex:** F **Month of Birth:** April	**Name:** Raymond Lewis **Age:** 14 **Sex:** M **Month of Birth:** October
Name: Kim Kobin **Age:** 14 **Sex:** F **Month of Birth:** September	**Name:** Karen Newbold **Age:** 14 **Sex:** F **Month of Birth:** April
Name: Lydia Corbett **Age:** 14 **Sex:** F **Month of Birth:** March	**Name:** Elise Cavit **Age:** 14 **Sex:** F **Month of Birth:** March
Name: Tom Olivo **Age:** 13 **Sex:** M **Month of Birth:** February	**Name:** Carroll Whitman **Age:** 13 **Sex:** M **Month of Birth:** November

LETTER NO. 1

My Company
8224 Oak Drive
Clemson, SC 29631

Your School
Your City, SC 29000

Dear Student:

Please send me the names of all students who are 14 years old with a birthday in April. I am compiling a list for a study I am doing.

Sincerely,

Jason Stewart

Jason Stewart

LETTER NO. 2 - OPTIONAL

2936 Abney Road
Anderson, SC 29621

Your School
Your City, SC 29000

Dear Student:

Please send me a list of the males older than 14.

I also need a list of the females.

Thank you,

Samuel Johnson

Samuel Johnson

LETTER NO. 3 - OPTIONAL

3333 Elm Street
Eureka, SC 29001

Your School
Your City, SC 29000

Dear Student:

I need a list of all females with the last name beginning with C.

Please also send me a list of males younger than 14.

Thank you,

Barbara Winters

Barbara Winters

14

DATA PROCESSING- FLOWCHARTING

Kit No. 91

STUDENT

LEARNING ACTIVITY GUIDE

Prepared by

Connie Conner
Westside High School
Anderson, South Carolina 29621

State Department of Education
Office of Vocational Education
Prevocational Education
Columbia, South Carolina 29201

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1978

INTRODUCTION

This activity is a simplified version of how a computer works. You may have some idea of how a person can program a computer to get one piece of information from a large amount of data. For example, if you wanted to find out how many gas service stations in New York City have a mechanic on duty 24 hours a day, you would have several possible ways of arriving at a solution. One way to find out is to spend hours calling every gas station on the phone and ask. Another way is to ask a computer and have a printed answer in a matter of minutes. Naturally, the whole process is more involved, but this activity will show you basically how to determine what information to feed (give) the computer to obtain the correct answer.

GOALS

The student will learn step-by-step planning of a program.

The student will understand proper flowcharting procedure.

The student will properly complete a personal data form.

The student will understand how a computer gets the true possibilities by eliminating those in the universe that will not fit the specifications.

DIRECTIONS

Follow each step in the book. DO NOT write in this book.

MATERIALS

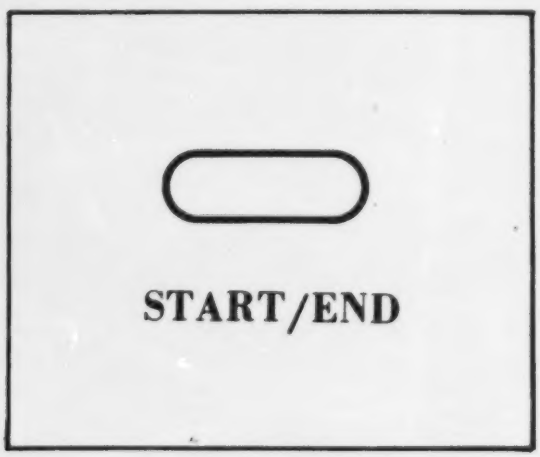
Pencil
2 sheets of paper
template from your teacher

PROGRAMMED TEXT

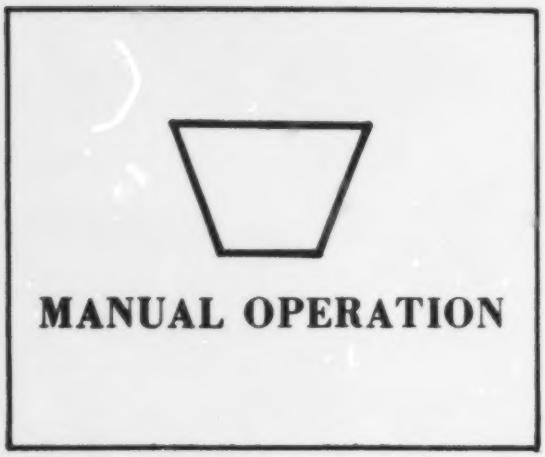
Instructional Objective 1

The student will identify eight flowchart symbols.

STEP 1 – Study the flowcharting symbols in the following steps so that you will know which ones to use when you make up a flowchart.

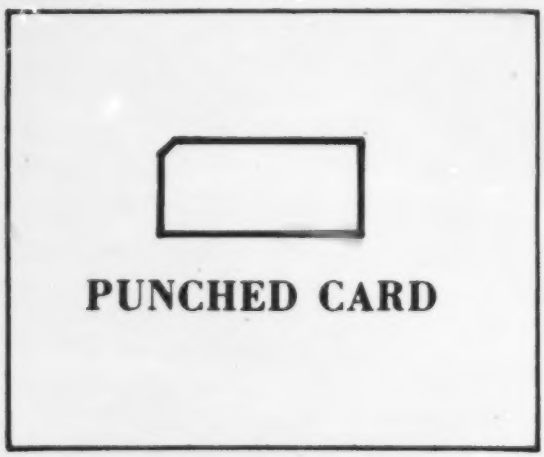


STEP 2 – This symbol is used to begin (or end) a computer program.

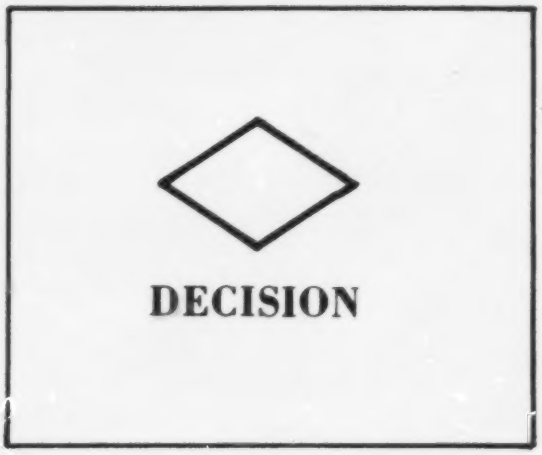


STEP 3 – This manual operation symbol means that an activity is being processed by hand, not by computer or machine.

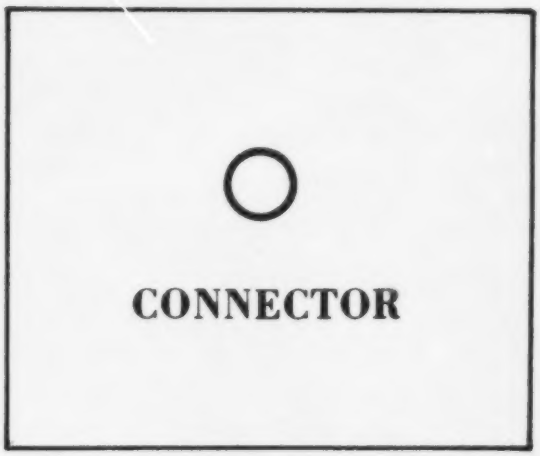
STEP 4 – This inverted triangle indicates that the data (usually business papers) are being stored or filed until later.



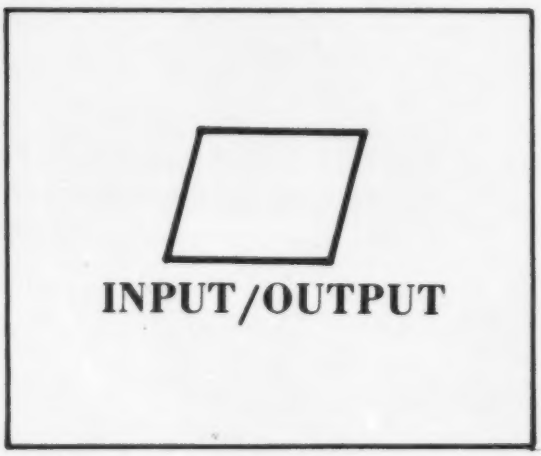
STEP 5 – This symbol means that data are being punched or stored on the keypunch cards.



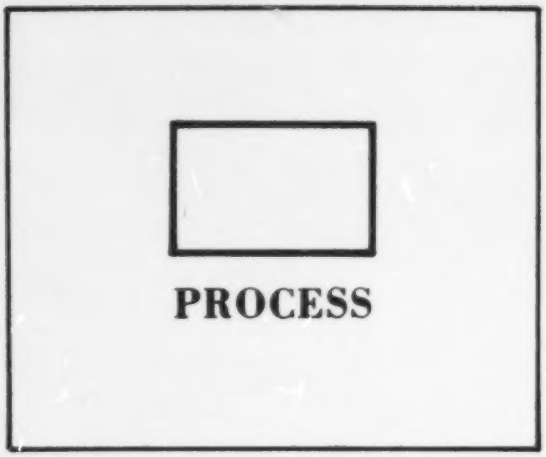
STEP 6 – This diamond-shaped symbol means that a decision (yes or no) must be made at a certain point within a program.



STEP 7 – This circle is used to join related symbols in a flowchart.



STEP 8 – This symbol is used to show that information is being put into the computer or taken out of the computer.



STEP 9 – This rectangle is used to show that the computer is performing automatic operations on the data.

Check Point

Obtain the handout for this checkpoint entitled "Identifying Flowchart Symbols" from your instructor.

Without looking at the programmed text, draw the correct symbol for each command.

Use your template to trace the symbol.

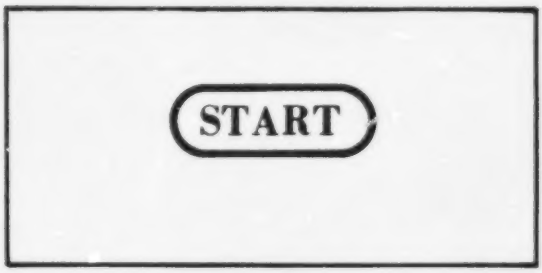
After you have drawn the flowchart symbols, go to your instructor and ask to see the master to check your answers.

If your answers are correct, proceed to the next objective.

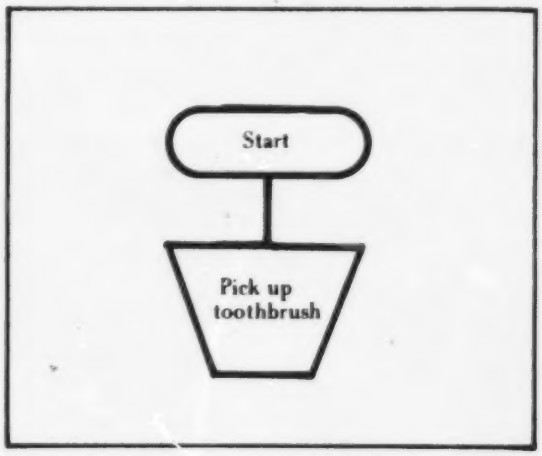
If they are wrong, repeat the objective and the checkpoint.

Instructional Objective 11

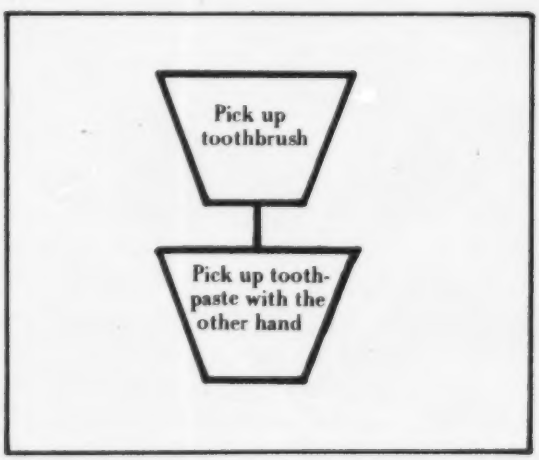
The student will decide which symbol to use for each step in a flowchart. (A flowchart is a plan of steps in a process.)



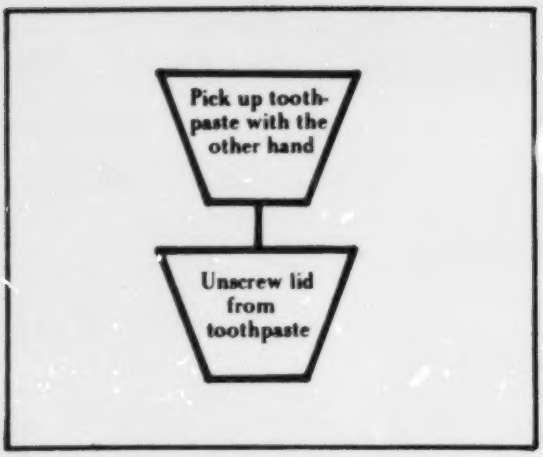
STEP 1 – How many steps do you go through brushing your teeth?



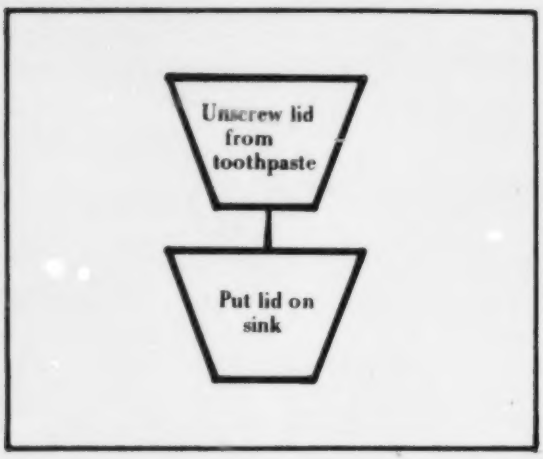
STEP 2 – First, you pick up your toothbrush.



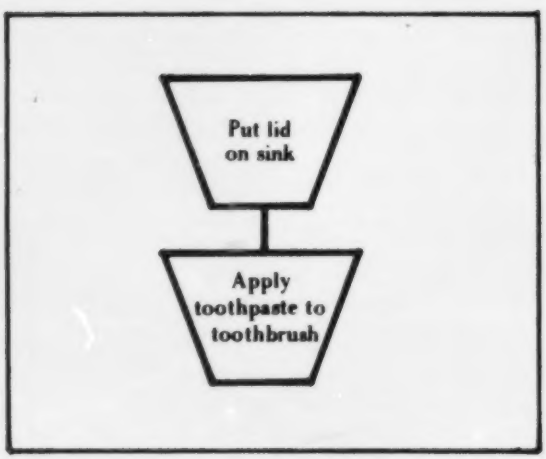
STEP 3 – Pick up the toothpaste with the other hand.



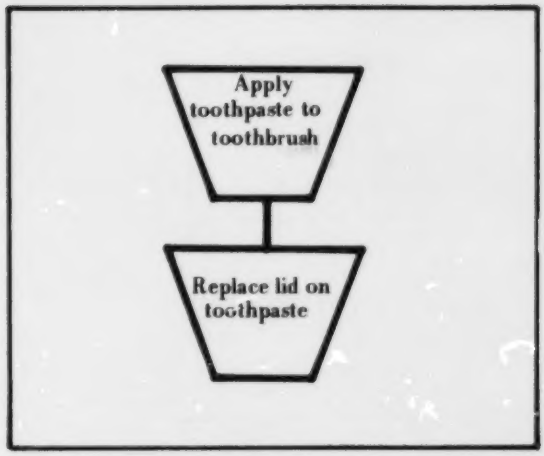
STEP 4 – Next, unscrew the lid from the toothpaste.



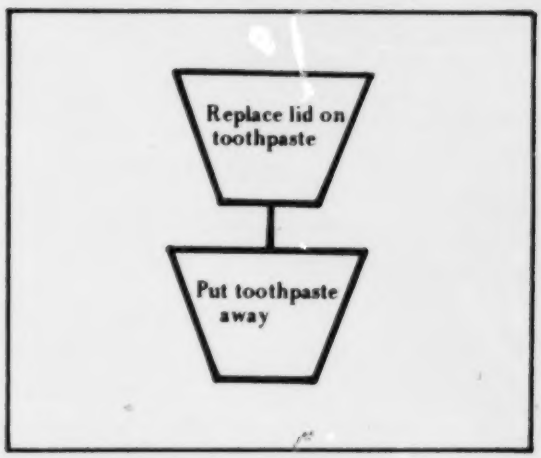
STEP 5 – Put the lid on the sink.



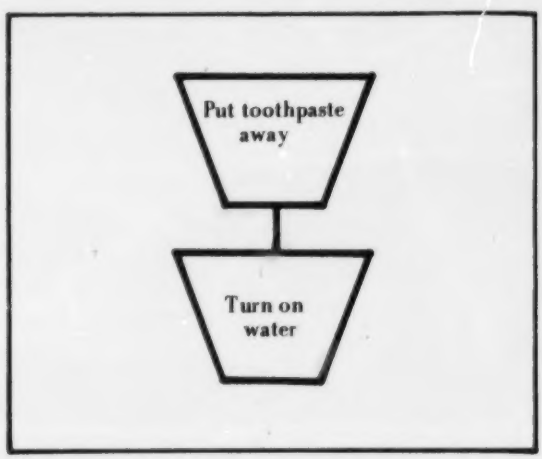
STEP 6 – Apply the toothpaste to the toothbrush.



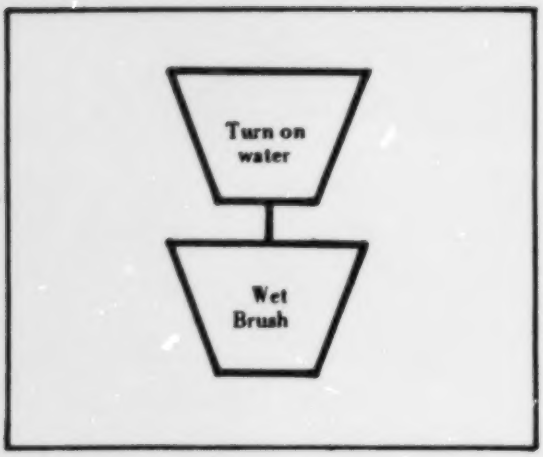
STEP 7 – Replace the lid on the toothpaste.



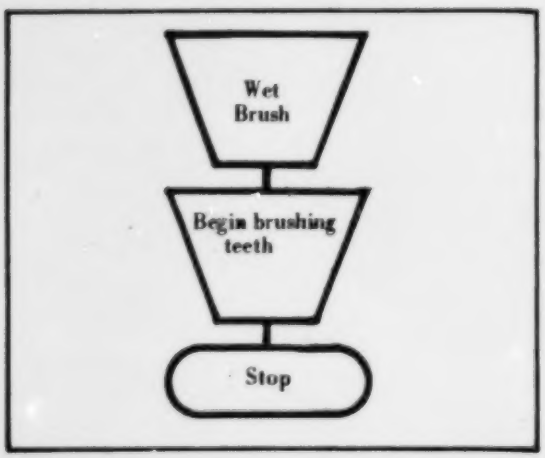
STEP 8 – Put the toothpaste away.



STEP 9 – Turn on the water.

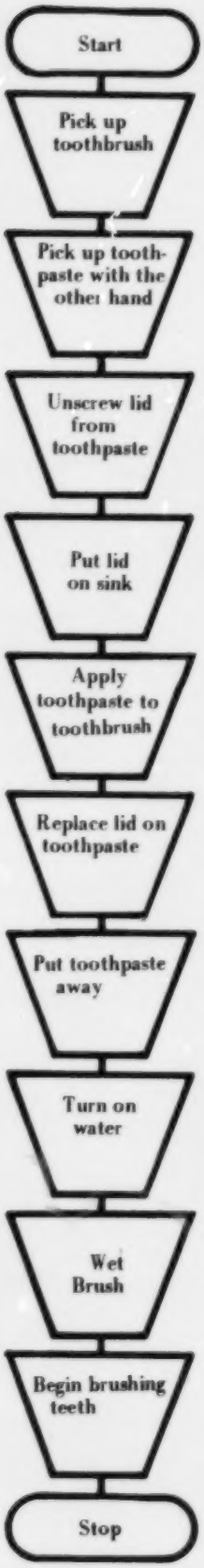


STEP 10 – Wet the brush.



STEP 11 – Begin brushing your teeth.

STEP 12 – A flowchart of this simple activity would look like this: ⟶

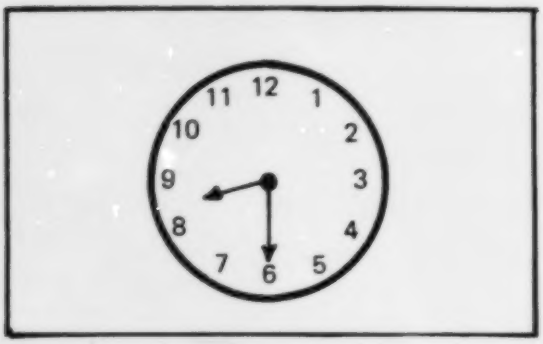


Check Point

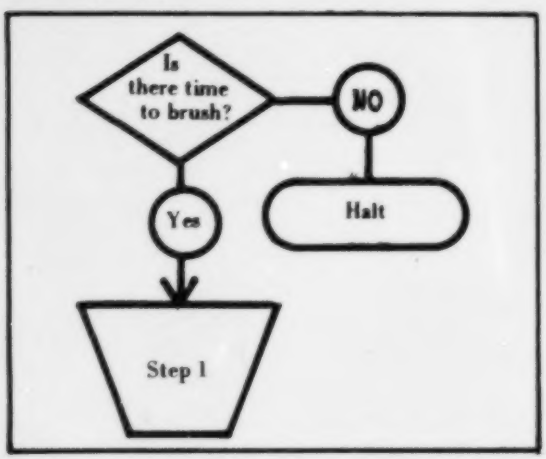
Can you follow every step in the flowchart?

Instructional Objective III

The student will draw a flowchart with a decision block.

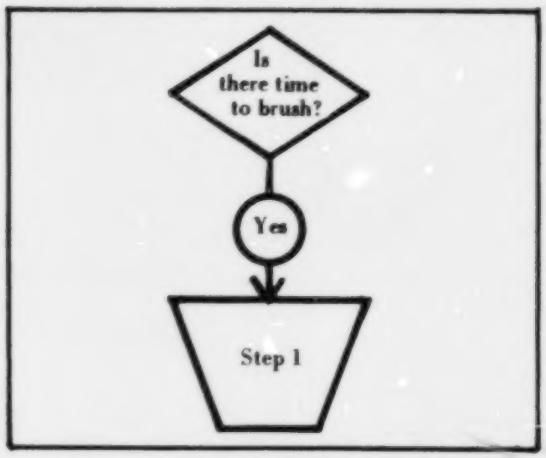


STEP 1 – What if you were running late this particular morning and you were going to have to decide between brushing your teeth and combing your hair?

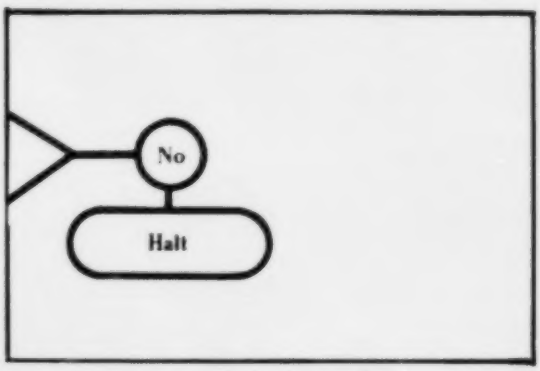


STEP 2 – Your flowchart would be changed by a decision block.

STEP 3 – The question in the decision block must be answered by a yes or no. For example: Do I have time to brush my teeth?



STEP 4 – To the bottom of the decision block goes the word yes in a circle. (If yes is the answer to the decision, follow each step after that until you reach the end or another decision block.)



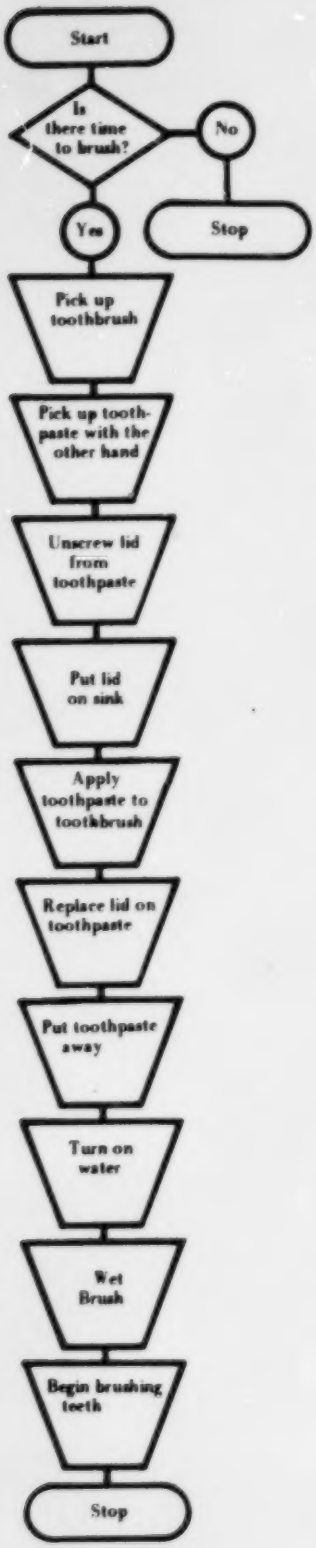
STEP 5 – To the right of the decision block goes the word no with a halt (or stop) step below it.

STEP 6 – Draw your flowchart for brushing your teeth. Use the steps in Objective I and include the decision block.

22

Check Point

Does your flowchart look like this?

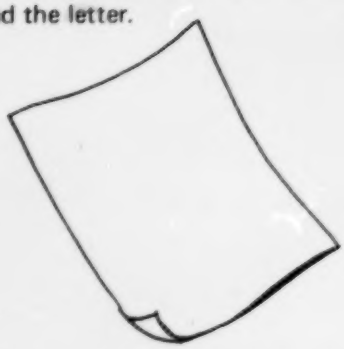


Instructional Objective IV

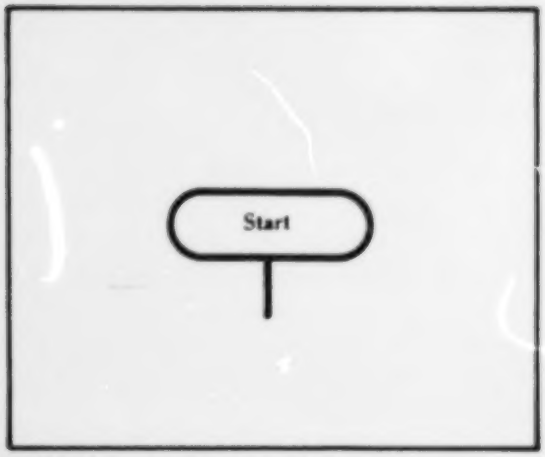
The student will design a flowchart using personal data sheets to obtain certain information.

STEP 1 – Obtain Letter 1 from your instructor.

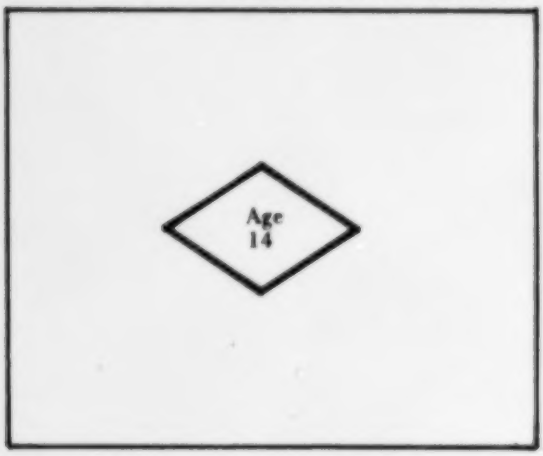
STEP 2 – Read the letter.



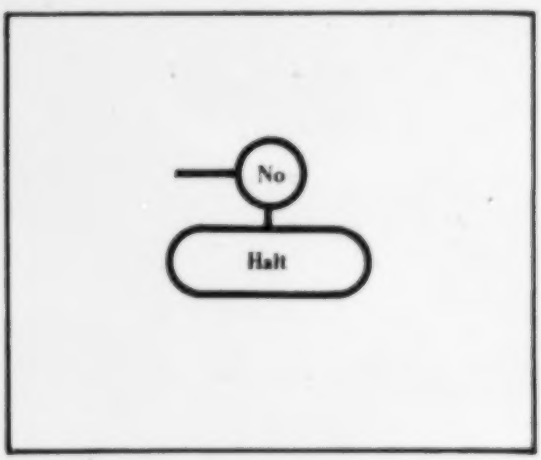
STEP 3 – Obtain a blank sheet of paper or use the back of the one you were writing on.



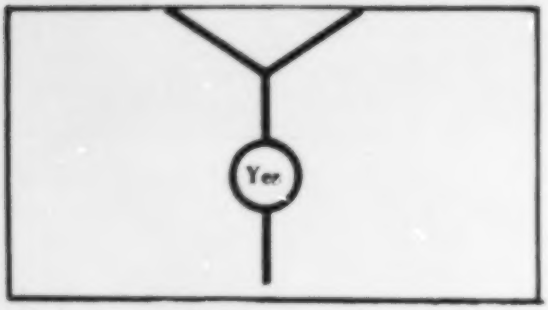
STEP 4 – At the top of the paper, draw a start symbol. Write start inside the terminal.



STEP 5 – Below it, put a decision block with "Age 14" on it.

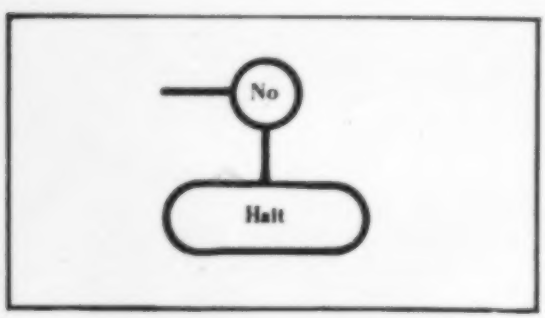


STEP 6 – Connect the two symbols with a line. To the right, draw a circle, write the word "no" in it, and a halt sign under it. Connect each symbol.

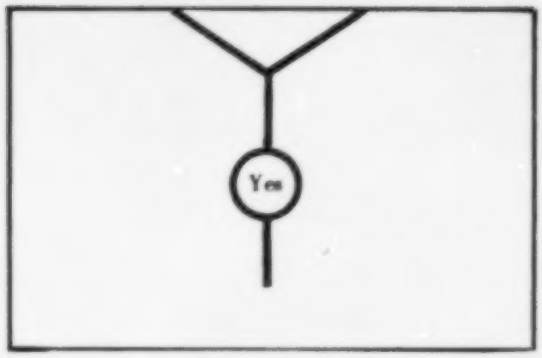


STEP 7 – On the bottom, draw a yes circle. Connect it to the decision block.

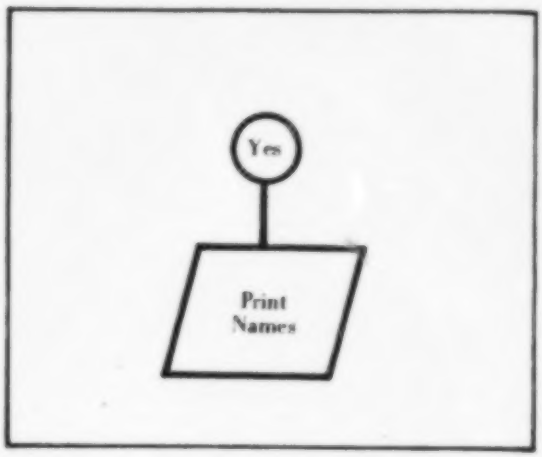
STEP 8 – After the yes, draw another decision block with "Birthday in April" on it. Connect it to the "yes" circle.



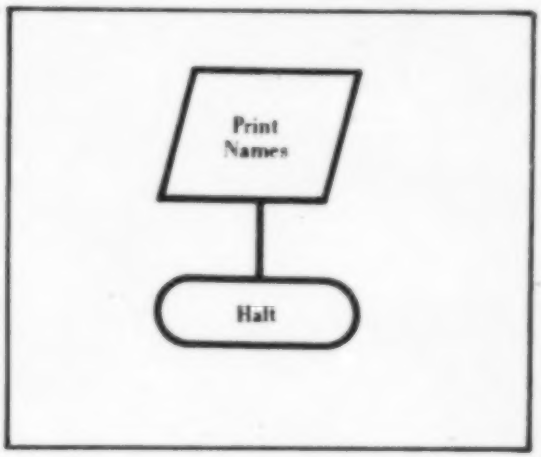
STEP 9 – To the right of the decision block, draw a "no" in a circle, and halt sign under it. Connect each symbol.



STEP 10 – Under the decision block, put a "yes" symbol. Connect it to the decision block.



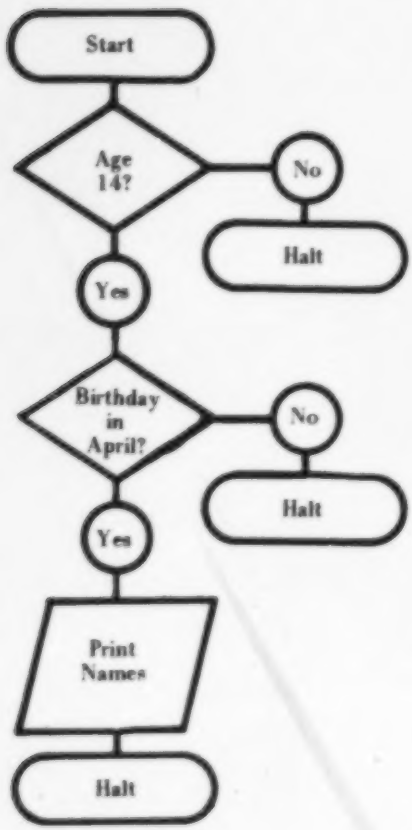
STEP 11 – Write or print names on an input/output print block. Connect it to the "yes" circle.



STEP 12 – Put a halt block after the input/output block. Connect the input/output symbol.

Check Point

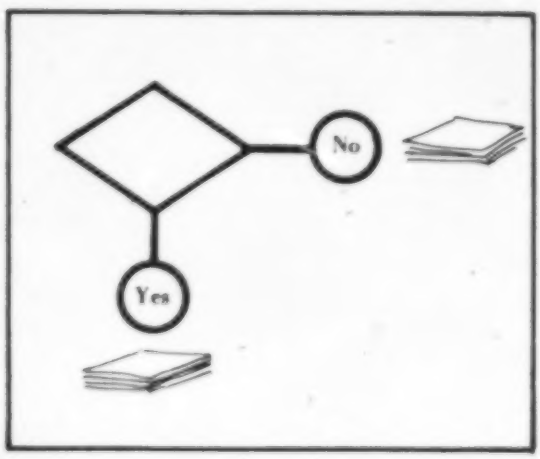
Does your flowchart look like this? If not, go back and try it again.



Instructional Objective V

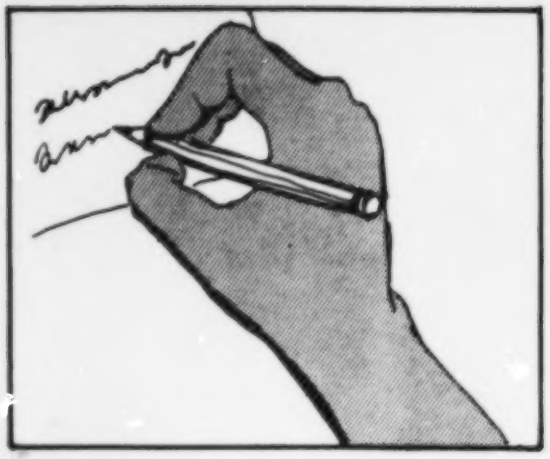
The student will differentiate between information in the same manner as a computer.

STEP 1 – Obtain a stack of personal data sheets from your instructor.



STEP 2 – Read through all the personal data sheets and pull out all those who are 14.

STEP 3 – Read through those who are 14, and pull out all those whose birthday is in April.



STEP 4 – Make a list of those students who are 14 and whose birthdays are in April.

Check Point

Give your list to your teacher to check. If it is incorrect, check the stacks again.

OCCUPATIONAL DESCRIPTIONS

213.382 -010 COMPUTER–PERIPHERAL–EQUIPMENT OPERATOR (clerical) assistant console operator; tape handler.

Operates *on-line* or *off-line* peripheral machines, according to written or oral instructions, to transfer data from one form to another, print *output*, and read data into and out of digital computer: Mounts and positions materials, such as reels of *magnetic tape* or *paper tape* onto spindles, decks of cards in hoppers, bank checks in magnetic ink reader-sorter, notices in *optical scanner*, or output forms and carriage tape in printing devices. Sets guides, keys, and switches according to oral instructions or *run* book to prepare equipment for operation. Selects specified wired control panels or wires panels according to diagrams and inserts them into machines. Presses switches to start off-line machines, such as card tape converters, or to interconnect on-line equipment, such as tape or card computer *input* and output devices, and high speed printer or other output recorder. Observes materials for creases, tears, or printing defects and watches machine and error lights to detect machine malfunction. Removes faulty materials and notifies supervisor of machine stoppage or error. Unloads and labels card or tape input and output and places them in *storage* or routes them to library. Separates and sorts printed output forms, using decollator, to prepare them for distribution. May operate punchcard tabulating machines, such as sorters and collators. May be designated according to specialty of equipment operated as CARD-TAPE-CONVERTER OPERATOR (clerical); HIGH-SPEED-PRINTER OPERATOR (clerical).